

WHAT IS CLAIMED IS

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1. A film-formation apparatus, comprising:

a film-formation chamber; and

a source gas supplying apparatus supplying a source gas to said film-formation chamber together with a carrier gas,

said source gas supplying apparatus comprising:

a concentration detector detecting a concentration of said source gas; and

15 a gas flow controller controlling a flow rate of an inert gas added to said carrier gas based on a result of measurement of said concentration of said source gas obtained by said concentration detector.

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25 2. A film-formation apparatus as claimed in claim 1, wherein said inert gas is added to said carrier gas that is carrying said source gas.

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3. A film-formation apparatus as claimed in claim 1, wherein said concentration detector is provided so as to measure said concentration of said

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source gas in the state said inert gas is added to said carrier gas.

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4. A film-formation apparatus as claimed in claim 1, wherein said gas flow controller changes said flow rate of said inert gas added to said carrier gas such that said concentration of said source gas as measured by said concentration detector falls in a predetermined concentration range.

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5. A film-formation apparatus as claimed in claim 1, wherein said concentration detector measures said concentration of said source gas before commencement of a film-formation process and/or during said film-formation process.

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6. A film-formation apparatus as claimed in claim 1, wherein said source gas supplying apparatus further includes a switching device switching a flow path of said carrier gas added with said inert gas, between a first path connected to said film-formation chamber and a second path bypassing said film-formation chamber, said concentration detector being provided in one of said first and second flow paths.

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7. A film-formation apparatus as claimed in  
claim 1, wherein said gas flow controller changes a  
flow rate of said inert gas to be added to said  
carrier gas, and wherein said gas flow controller  
5 further changes a flow rate of said carrier gas such  
that a total flow rate of said carrier gas and said  
inert gas is maintained generally constant.

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8. A film-formation apparatus as claimed in  
claim 1, wherein said carrier gas and said inert gas  
are introduced from an identical flow path, said  
15 inert gas being then diverted to another flow path  
before said carrier gas is admixed with said source  
gas, said inert gas merging again with said flow path  
of said carrier gas after said carrier gas is admixed  
with said inert gas.

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9. A film-formation apparatus as claimed in  
25 claim 1, wherein said gas flow controller controls a  
flow rate of said inert gas in said another flow path.

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10. A film-formation apparatus as claimed  
in claim 1, wherein said source gas is formed by  
vaporizing a source material of which vapor pressure

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less than 266Pa at a temperature at which said source material is used.

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11. A film-formation apparatus as claimed in claim 1, wherein said source gas is W(CO)<sub>6</sub>.

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12. A film-formation apparatus as claimed in claim 1, wherein said concentration detector is a Fourier transform infrared spectrometer.

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13. A source supplying system of a film-formation apparatus, comprising:

a concentration detector detecting a concentration of said source gas; and

25 a gas flow controller controlling a flow rate of an inert gas added to said carrier gas based on a result of measurement of said concentration of said source gas obtained by said concentration detector.

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14. A film-formation apparatus, comprising:

5        a film-formation chamber; and  
a source gas supplying apparatus supplying  
a source gas to said film-formation chamber together  
with a carrier gas via a gas passage in the form of a  
mixed gas,  
10      said source supplying apparatus comprising:  
a gas concentration measurement part  
measuring the concentration of said source gas  
contained in said mixed gas in said gas passage;  
15      a gas concentration controller connected to  
said gas passage, said gas concentration controller  
adding an inert gas to said mixed gas in said gas  
passage; and  
20      an inert-gas flow-rate controller  
controlling the flow rate of said inert gas added by  
said gas concentration controller based on a measured  
concentration of said source gas obtained by said gas  
concentration measurement part,  
25      said gas concentration measurement part  
including a manometer for measuring the pressure of  
said mixed gas in said gas passage, said gas  
concentration measurement part correcting said  
measured concentration of said source gas based on a  
pressure measured by said manometer.

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30      15. A film-formation apparatus as claimed  
in claim 14, wherein said gas concentration  
measurement part includes a gas concentration  
detector that supplies a probe signal to said mixed  
gas in said gas passage, said gas concentration

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detector producing a detection signal corresponding to said concentration of said source gas based upon said probe signal passed through said mixed gas,

    said gas concentration measurement part

5    further including a signal processing unit correcting said signal obtained by said gas concentration detector by said pressure and calculating an absolute concentration of said source gas in said mixed gas from said signal corrected by said pressure.

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16. A film-formation apparatus as claimed  
15    in claim 15, wherein said signal processing unit multiplies a correction term, which includes said pressure of said mixed gas at a denominator, to a value of said signal detected by said gas concentration detector.

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17. A film-formation apparatus as claimed  
25    in claim 15, wherein said manometer is provided at any of an upstream side and a downstream side of said gas concentration detector.

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18. A film-formation apparatus as claimed in claim 14, wherein said concentration measurement part

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measures said concentration of said source gas in said gas passage at a downstream side of a location where said inert gas is admixed to said mixed gas.

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19. A film-formation apparatus as claimed in claim 14, wherein said concentration measurement 10 part measures said concentration of said source gas in said gas passage at an upstream side of a location where said inert gas is added to said mixed gas.

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20. A film-formation apparatus as claimed in claim 15, wherein said gas concentration detector injects infrared light to said mixed gas and produces 20 said signal based upon an infrared absorption spectrum of said infrared light passed through said mixed gas.

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21. A film-formation apparatus as claimed in claim 15, wherein said gas concentration detector comprises a Fourier transform infrared spectrometer.

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22. A film-formation apparatus as claimed in claim 14, wherein said gas concentration detector comprises a non-dispersion infrared spectrometer.

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23. A film-formation apparatus as claimed in claim 20, wherein said gas concentration detector 10 comprises a mirror disposed in said gas passage and a heating element heating said mirror.

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24. A film-formation apparatus as claimed in claim 14, wherein said mixed gas has a pressure of 1.33kPa or less in said gas passage.

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25. A method of detecting a gas concentration, comprising the steps of:

supplying a mixed gas containing therein a source gas to a flow passage;

measuring the pressure of said mixed gas in said flow passage;

30 injecting infrared light to said mixed gas in said flow passage;

acquiring an absorption spectrum of said source gas by detecting said infrared light after said infrared light has passed through said mixed gas

in said flow passage;

acquiring the concentration of said source  
gas in said mixed gas by correcting an intensity of  
said absorption spectrum, said step of correction  
5 comprising the step of applying a correction term  
including therein said pressure.

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26. A method as claimed in claim 25,  
wherein said correction term includes a term of said  
pressure at a denominator.

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27. A method as claimed in claim 25,  
wherein said step of injecting said infrared light is  
20 conducted by using an interferometer capable of  
changing a baseline length and by changing said  
baseline length.

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28. A method as claimed in claim 25,  
wherein said step of acquiring said absorption  
spectrum includes fast Fourier-transform processing.

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29. A method as claimed in claim 25,  
wherein any of said step of injecting said infrared  
light and said step of detecting said infrared light  
includes the step of interrupting said infrared light  
5 intermittently at an upstream side, in an optical  
path of said infrared light, of a detector used for  
detecting said infrared light.